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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|------------------------|------------------|
| 10/724,100 | 12/01/2003 | Roderick M. Townes | 84715 3054 GNN | 1413 |
| 20736 | 7590 | 03/25/2005 | EXAMINER | |
| MANELLI DENISON & SELTER 2000 M STREET NW SUITE 700 WASHINGTON, DC 20036-3307 | | | VERDIER, CHRISTOPHER M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 3745 | |
| DATE MAILED: 03/25/2005 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|---------------------------------|-------------------------------|--|
| Office Action Summary | Application No. 10/724,100 | Applicant(s) TOWNES ET AL. | |
| | Examiner Christopher Verdier | Art Unit 3745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>12-1-03</u> . | 6) <input type="checkbox"/> Other: _____ |

Receipt and entry of Applicants' Preliminary Amendment dated December 1, 2003 is acknowledged.

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in the United Kingdom on December 6, 2002. It is noted, however, that applicant has not filed a certified copy of the application as required by 35 U.S.C. 119(b).

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the fins with different heights and/or shapes and/or presentational angles (claim 9), and the ripple strips, trip strips, and other heat transfer augmentation features (claim 12) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the

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drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The first unnumbered drawing figure on sheet 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to because the first unnumbered drawing figure on sheet 1 must be numbered. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the

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appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: Appropriate correction is required.

There is no description of the first unnumbered drawing figure on sheet 1.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: claim 12, which recites that the fins have different heights and/or shapes and/or presentational angles, has no antecedent basis in the specification for the terms "and/or".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4, 9, and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 4 recites that the release passages have a slight downward inclination towards the flow entrainment means. The term "slight" is a relative term which renders the claim indefinite. The term "slight" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. See also MPEP 2173.05(b) and note *Ex parte Oetiker*, 23 USPQ2d 1641 (Bd. Pat. & Inter. 1992) (the phrase "relatively shallow" was held to be indefinite because the specification lacked some standard for measuring the degree intended). The examiner suggests that the term "slightly" be deleted. Claim 9 contains three instances of the term "and/or" (lines 2 and 4). Due to the three instances of the term "and/or", the claim is indefinite and unclear as to scope. The examiner suggests that Applicant eliminate the term "and/or" from the claim. Claim 12, lines 1-2, which recites "and other heat transfer augmentation features", renders the claim indefinite because the claim would include elements not actually disclosed (those encompassed by "other heat transfer augmentation features"), thereby rendering the scope of the claim(s) unascertainable. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 5-8, and 10-12, (as far as claim 12 is definite) are rejected under 35

U.S.C. 102(b) as being anticipated by Broadhead 5,531,568. Note the blade cooling arrangement comprising a blade tip including a coolant gallery 28 in use upstream of flow entrainment means 29, the gallery including release passages 30 to release coolant in use close to the blade tip surface whilst the flow entrainment means entrains that released coolant to facilitate flow isolation from turbulent air created by a shroud 23 or an unnumbered leading edge of the blade tip, with the gallery including a cavity from which the release passages extend, with the release passages 30 extending laterally towards the flow entrainment means, with the flow entrainment means comprising upstanding fins to form channels for entrainment of the coolant flow, the fins extending above the height of the release passages, the fins being substantially perpendicular to the blade tip surface, with each fin having substantially the same height, with the fins providing additional contact surface area for enhanced heat transfer to the coolant airflow, with the flow entrainment means defining channels through which the coolant flow is driven in use by rotation of the blade tip (see column 3, lines 6-8 and note that the coolant flow through the channels is forced therethrough in a direction opposite to the direction of rotation), and the blade tip including trip strips 31 to improve heat transfer between the coolant air flow and the blade tip.

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Claims 1-2, 5-7, and 9-12 (as far as claims 9 and 12 are definite) are rejected under 35 U.S.C. 102(b) as being anticipated by Eiswerth 4,390,320. Note the blade cooling arrangement comprising a blade tip including a coolant gallery (unnumbered, formed by walls 16 and 17 in figure 3) in use upstream of flow entrainment means 32a, 32b, 32c, the gallery including release passages 23, 24 to release coolant in use close to the blade tip surface whilst the flow entrainment means entrains that released coolant to facilitate flow isolation from turbulent air created by a leading edge 14 of the blade tip, with the gallery including a cavity from which the release passages extend, with the flow entrainment means comprising upstanding fins 32a, 32b, 32c to form channels for entrainment of the coolant flow, with the fins extending above the height of the release passages, and the fins being substantially perpendicular to the blade tip surface, and the fins having different heights relative to the respective release passages for specific coolant entrainment as required for a particular part of the blade tip dependent upon desired cooling efficiency and/or blade structural integrity, with the fins providing additional contact surface area for enhanced heat transfer to the coolant airflow, with the flow entrainment means defining channels through which the coolant flow is driven in use by rotation of the blade tip (note that the coolant flow through the channels is forced therethrough in a direction opposite to the direction of rotation), with the blade tip including a heat transfer augmentation feature 42 to improve heat transfer between the coolant air flow and the blade tip (the thermal barrier coating 42 isolates the blade from hot gases and thus results in improved heat transfer between the coolant air flow and the blade tip).

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Claims 1-3, 5-8, 10, and 12, (as far as claim 12 is definite) are rejected under 35 U.S.C. 102(b) as being anticipated by Lee 5,733,102. Note the blade cooling arrangement comprising a blade tip including a coolant gallery 34 in use upstream of flow entrainment means 42, the gallery including release passages 46 to release coolant in use close to the blade tip surface whilst the flow entrainment means entrains that released coolant to facilitate flow isolation from turbulent air created by a leading edge 28 of the blade tip, with the gallery including a cavity from which the release passages extend, with the release passages 46 extending laterally towards the flow entrainment means, with the flow entrainment means comprising upstanding fins 38a, 38b to form channels 42, 40 for entrainment of the coolant flow, the fins extending above the height of the release passages, the fins being substantially perpendicular to the blade tip surface, with each fin having substantially the same height, with the fins providing additional contact surface area for enhanced heat transfer to the coolant airflow, with the blade tip including a heat transfer augmentation feature 48 to improve heat transfer between the coolant air flow and the blade tip (the thermal barrier coating 48 insulatingly isolates the blade from hot gases and thus results in improved heat transfer between the coolant air flow and the blade tip). Concerning claim 5, which recites that the upstanding fins form channels "for entrainment of the coolant flow", this is a recitation of intended use. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 370 F.2d 576, 152

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USPQ 235 (CCPA 1967) and *In re Otto*, 312 F.2d 937, 939, 136 USPQ 458, 459 (CCPA 1963).

Channel 40 is capable of the use "for entrainment of the cooling flow".

Claims 1-3 are rejected under 35 U.S.C. 102(e) as being anticipated by Lee 6,790,005.

Note the blade cooling arrangement comprising a blade tip including a coolant gallery 32 in use upstream of flow entrainment means 42, 44, the gallery including release passages 58 to release coolant in use close to the blade tip surface whilst the flow entrainment means entrains that released coolant to facilitate flow isolation from turbulent air created by a leading edge 22 of the blade tip, with the gallery including a cavity from which the release passages extend, with the release passages 58 extending laterally towards the flow entrainment means (column 5, lines 18-22). Applicant cannot rely upon the foreign priority claim to overcome this rejection because a copy of said papers and a certified translation thereof (if not in English) has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Claims 1-3, 5-8, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent Publication 58-47,104 (figures 4-7). Note the blade cooling arrangement comprising a blade tip including a coolant gallery 22 in use upstream of flow entrainment means 23, the gallery including release passages 24 to release coolant in use close to the blade tip surface whilst the flow entrainment means entrains that released coolant to facilitate flow isolation from turbulent air created by a shroud 4 or an unnumbered leading edge of the blade tip, with the gallery including a cavity from which the release passages extend, with the release passages 24 extending laterally towards the flow entrainment means, with the flow entrainment

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means comprising upstanding fins to form channels for entrainment of the coolant flow, the fins extending above the height of the release passages, the fins being substantially perpendicular to the blade tip surface, with each fin having substantially the same height, with the fins providing additional contact surface area for enhanced heat transfer to the coolant airflow.

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

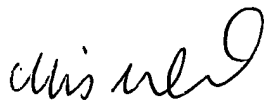
Cherry is cited to show a turbine blade tip with angled ribs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
March 19, 2005


Christopher Verdier
Primary Examiner
Art Unit 3745